Wyndham City Council
Green Living Series
Solar Information Session

Time – 10am to 12pm
Date - February 2nd 2019
Presenter – Warwick Tullio

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Common Questions

- Why install solar panels?
- How can I reduce my energy usage and get the most benefit?
- What size solar system do I actually need?
- How do I find a reputable installer?
- What system types are there and the key components?
- What makes a good quality solar system (brands/warranties)?
- What are the expected system costs?
- What rebates or incentives are available and am I eligible?
- What are the steps involved to get solar connected?

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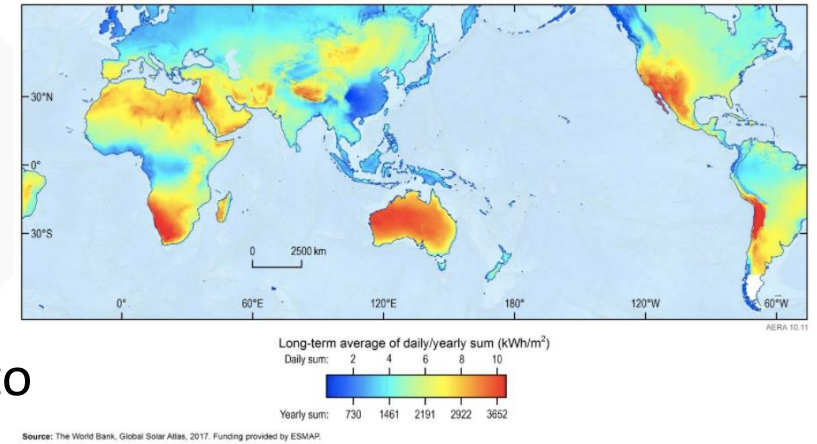
Background Facts



- Solar panels use the energy of the sun to generate electricity - cleanly and quietly
- Australia is one of the sunniest continents in the world so ideal for solar photovoltaics (PV)
- Over 2 million households in Australia have already installed solar panels and are enjoying the benefits
- As of November 2018 – 20.3% of homes in Australia now have a solar PV system
- The average residential solar system size continues to grow as prices decrease (6.27kW at the end of 2017)

Data Source: https://www.cleanenergycouncil.org.au/resources/technologies/solar-energy

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Motivation – Why install Solar?

- Reduce your energy bills
- Protect against rising energy costs
- Earn a return on your investment
- Increase the value of your property
- Protect the environment
- Demonstrate your commitment to sustainability
- Help with grid security and energy supply
- Clean and renewable energy generated from the sun just makes sense

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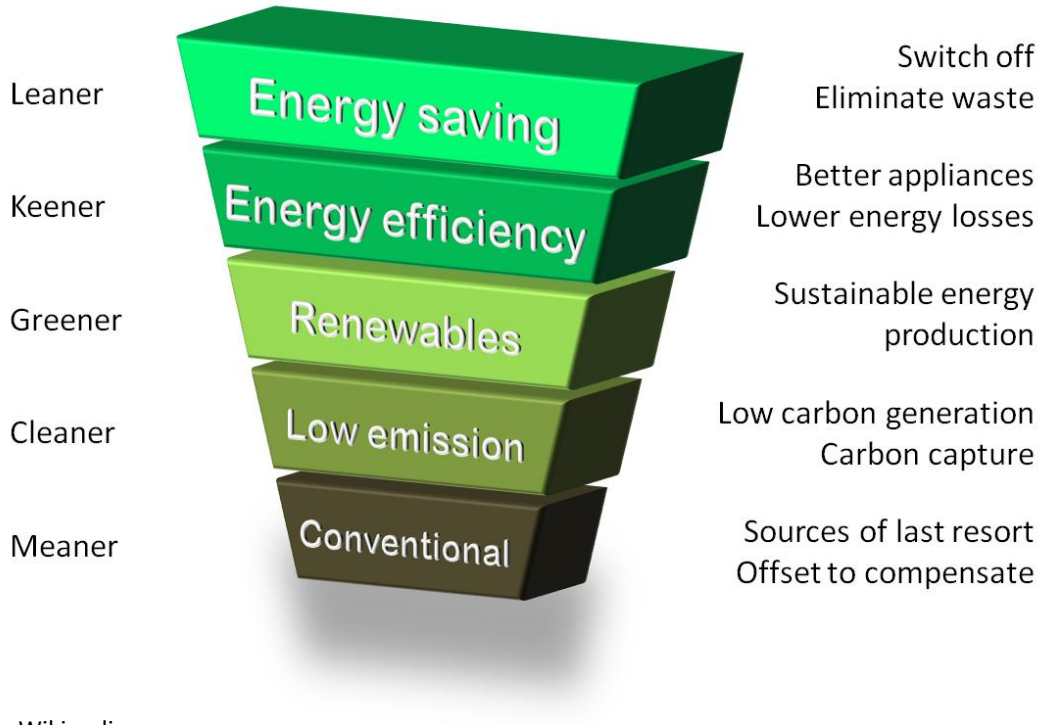
Energy Reduction Options

Energy Hierarchy (Leaner, Keener and then Greener!)



Source: Energy Hierarchy - Wikipedia

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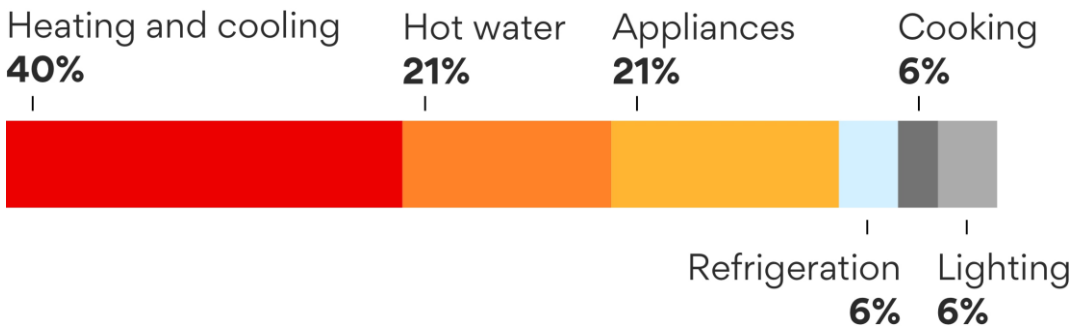
Energy Efficiency Tips



- Heating - Set your heat to 18-20 deg C – each degree over 20 deg C uses around 10% more energy
- Cooling - Set your air con to 24 deg C or higher – each degree under uses 5% more energy
- Energy saving, efficiency and reduction can make a huge impact on your overall energy usage, bill costs and required solar system size

Source: https://www.originenergy.com.au/for-home/electricity-and-gas/info/energy-efficiency-tips.html

What Size Solar System?

The following points help determine the best size for your home:

- Understanding energy usage (kWh)
- Roof availability considerations (m^2)
- Energy and bill offset expectations (%)
- Available budget ($)
- Battery storage system now or in the future?

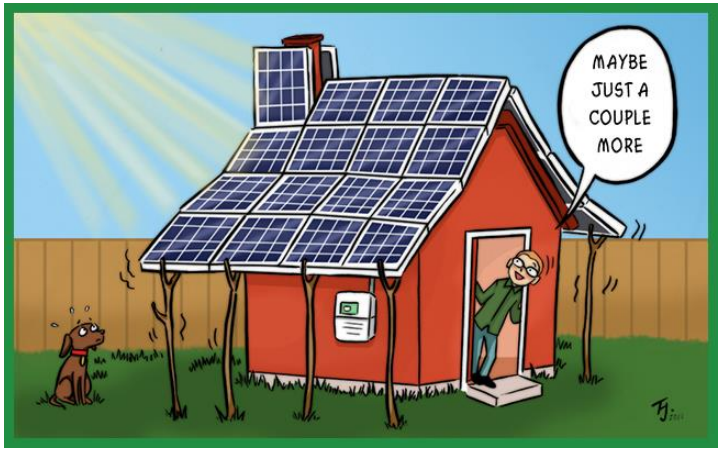


Image Source: https://www.solarquotes.com.au/blog/oversizing-solar-arrays/

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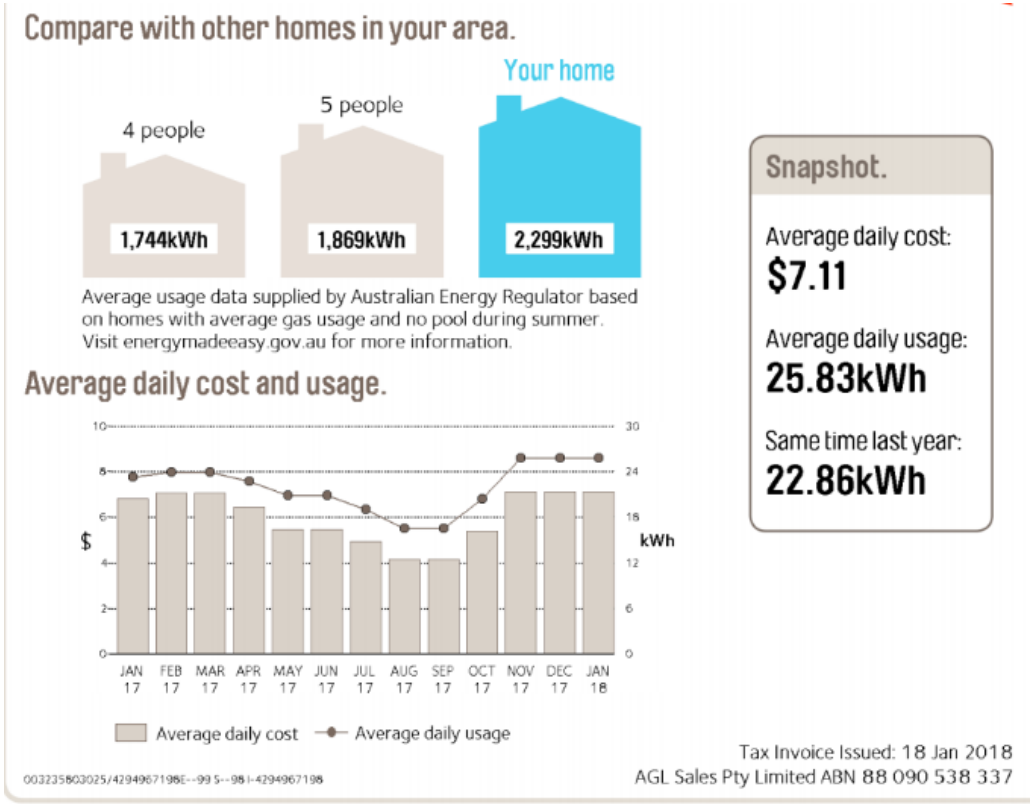
Understanding Energy Usage



- Power bills
- Manual meter readings
- Smart meter interval data
- Retailer or distributor energy portals

Image Source: https://instylesolar.com/blog/2018/02/15/how-to-read-your-electricity-bill/

Roof Considerations

- Free roof area for solar PV panels
- Roof angle and direction
- Roof type (tin, tile, flat deck)
- Possible shade influences
- Roof accessibility (cleaning / maintenance)
- Existing equipment access (breather pipes, tv antennas, aircon units, solar pool heating, solar hot water)

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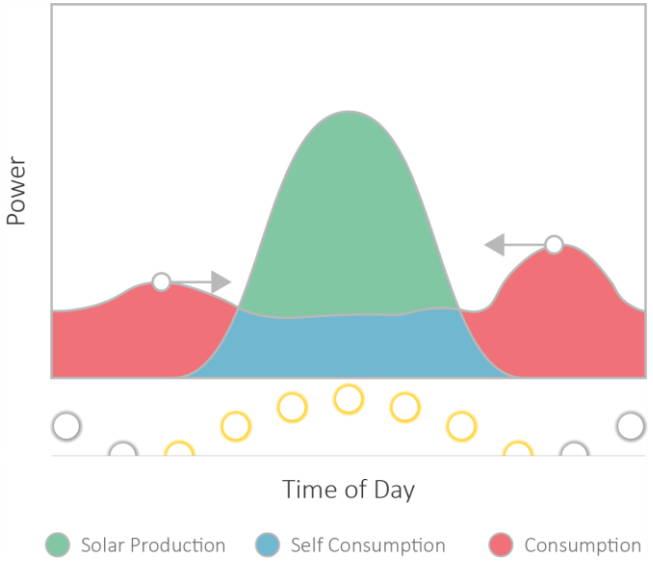
Energy Offset Expectations

- Solar panels only generate power during daylight hours
- Solar systems can be sized to generate all the energy required for a home over 24 hours
- Realistic direct energy offsets (self consumption) of 50% can be achieved without batteries – bill savings are higher (FiT)
- Batteries store excess solar energy to ensure 100% self consumption if sized correctly

Typical home consumption and generation profile



Graph Source: https://psccan.com.au/energy-management/solar-graph-moving-loads/

Matching Energy Use

Actual energy generation and offsets will depend on:

- Solar panel direction (orientation)
- Solar panel angle (inclination)
- Time of year (Summer/Winter)
- Panel temperature (deg C, wind speed)
- When energy is actually consumed and who is home during the day
- If load shifting in the home is possible

(via timers, smart appliances or user habits)

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Basic System Sizing Example

- A. Average daily energy use (kWh)
- B. Average annual peak sun hours for Melbourne (h)
- C. Solar system size = A/B = C

- General Example

  A = 20kWh, B = 4h

  C = 20kWh/4h = <u>5kW*</u>

Source: www.energymatters.com.au/residential-solar/home-solar-sizing/

*Solar systems are not 100% efficient – typical losses of 10% due to system losses can be expected even under ideal conditions. Oversizing should be considered to accommodate this particularly if batteries are to be installed.

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Choosing a Solar Supplier

- Clean Energy Council (CEC) Approved Retailer (Solar PV Retailer Code of Conduct – commitment to high levels of quality and service)
- Confirm CEC accredited designers and installers
- Check if they use subcontractors or in-house installers
- Reputable company with a proven history – how long in the industry (in case service or warranty claims are required in the future)
- Have they won any industry awards for excellence
- Ask to speak with a referee (existing customer) to confirm how they performed and how the system is operating
- Always get 3 quotes to compare pricing and service

http://www.solaraccreditation.com.au/consumers/purchasing-your-solar-pv-system/finding-a-solar-retailer.html

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Basic Solar System Options

*Focus of todays discussion – Grid Connected

- Grid Connected Solar*
  (Battery Ready – with AC Battery
  eg: Tesla, Sonnen, Enphase etc)

- Hybrid Solar
  (Grid Connected with DC Battery)

- Off-Grid Solar (Remote Areas)
  (No grid connection – DC Battery only)

Image Source: https://www.cleanenergyreviews.info/blog/2014/5/4/how-solar-works

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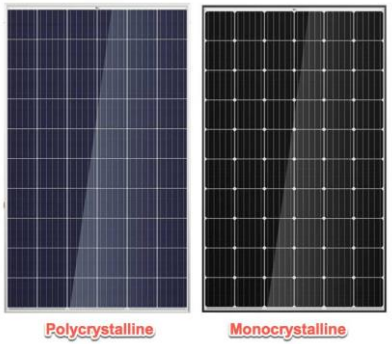
Key System Components

- Solar Inverters (Grid Connected)
  (String inverter, DC optimizers, Micro inverters)

- Solar Panels
  (Monocrystalline, Polycrystalline, Thin-film)



- Component Framing (pitched/flat)
- System monitoring (production/consumption/exports)
- Batteries (AC or DC)

Image Source: https://www.solarquotes.com.au/solar101.html

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Component Warranties

Usually a good indicator of component quality

- Solar Inverters
  - Standard (5, 10 or 12 years)
  - Extended (20 + years for additional cost)
- Solar Panels
  - Manufacturer (10, 12, 15 or 25 years)
  - Performance (Linear reduction over 25 years)
- Framing (Finish warranty - typically 10 or more years)
- Batteries (Brand dependent, based on # of full cycles, 3600 cycles is around 10 years of daily use)

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Key Manufacturer Considerations

- Many solar panel manufacturers and inverter brands to choose from (Clean Energy Council Approved Components List)
- Country of origin and manufacture can sometimes be misleading

  (ie: designed in Germany but made in China)
- Company brand name, reputation and length of time in the industry is usually a good indicator
- Warranty period and local office or representation is important in case anything were to go wrong
- Third party insurance policy protection and claim costs
- Installer warranty period and ongoing support service

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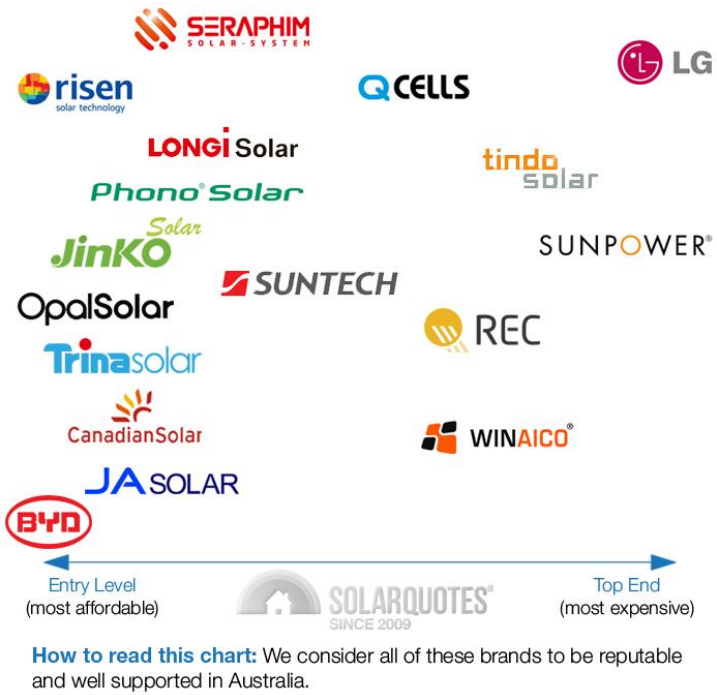
Solar Component Options



How to read this chart: We consider all of these brands to be reputable and well supported in Australia.

Solar Panel Brand Options

Inverter Brand Options

How to read this chart: We consider all of these brands to be reputable and well supported in Australia.

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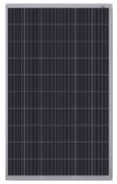
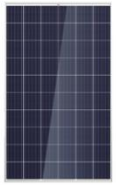
Image Source: https://www.solarquotes.com.au/solar101.html

Panel Cost Example

Example of how pricing can change due to brand, technology or country of manufacture

Product Name	JA Solar JAP6(K)-60	Seraphim SRP-6PB	Suntech STP Poly	Phono Solar Premium Poly	Trina Solar Honey	QCells Q.POWER-G5	REC Peak Energy	Tindo Karra	Winaico WST-P6	LG NeON 2	Sunpower E Series
											
Product Logo	JA SOLAR	SERAPHIM	SUNTECH	Phono Solar	Trinasolar	Q CELLS	REC	tindo solar	WINAICO	LG	SUNPOWER
Model number(s)	JAP6(K)-60-255/4	SRP-255-6PB-DC	STP275-20/Wfw	PS265P-20/U	TSM-PD05	Q.POWER-G5 26	REC250PE	Karra-285	WST-275P6	LG325N1C-A5	SPR-E19-320
Approx Cost per Watt - AUD Retail incl GST	$0.74	$0.87	$0.77	$0.67	$0.63	$0.78	$0.79	$1.12	$0.84	$1.19	$1.60
Approx cost per panel - AUD Retail incl GST	$188	$221	$211	$177	$182	$202	$197	$319	$231	$386	$512
Panel technology	Polycrystalline	Polycrystalline	Polycrystalline	Polycrystalline	Polycrystalline	Polycrystalline	Polycrystalline	Monocrystalline	Polycrystalline	Monocrystalline	Monocrystalline
Country of manufacture	China	China	China	China	China	South Korea/China/Malaysia	Singapore	Australia	Taiwan	South Korea	Malaysia/Philippines/Mexico
Company origin	China	China	China	China	China	Germany (now owned by Korean Hanwha)	Norway	Australia	Taiwan	South Korea	USA

Source: https://www.solarquotes.com.au/panels/comparison/compare-solar-panels/

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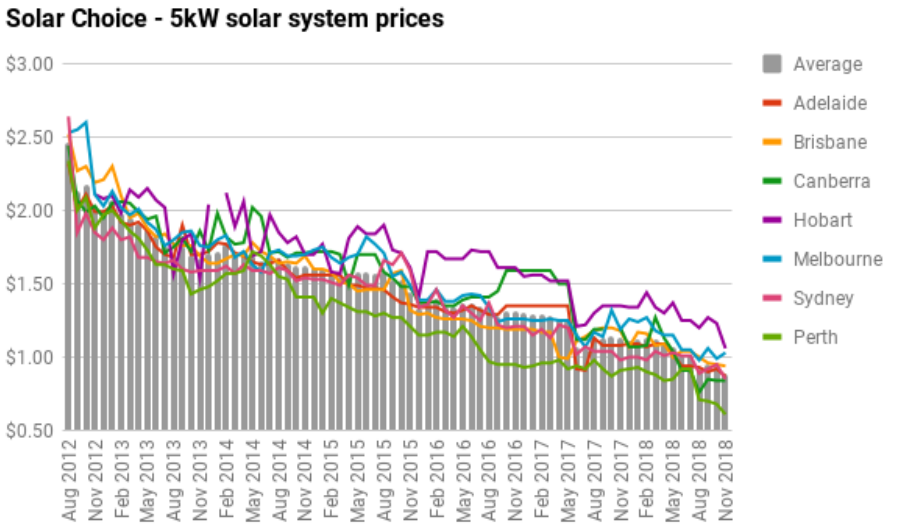
Example System Prices

Grid Connected 5kW Price Range (including STC discount but *excluding* gov't rebate):

- Standard String - $6,250 to $7,500 ($1.25/W to $1.50/W)
- Smart String (DC Optimized) – $7,000 to $8,000 ($1.50/W to $1.75/W)
- Micro Inverter - $8,750 to $10,000 ($1.75/W to $2.00/W)

Graph Source: https://www.solarchoice.net.au/home-solar-system-prices



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Current Rebates and Incentives

- Small Scale Technology Certificate (STC) discount
  - offered by solar company at the point of sale and deducted from the total cost meaning you are never out of pocket
  - discount is approx. $2,500 for a 5kW system in VIC (@ $33/STC)
- Feed-in Tariff (FiT) incentive offered by your energy retailer
  - 9.9c/kWh, 11.3c/kWh, 68c/kWh (PFiT) or retailer specific
- Victorian Government Solar PV rebate
  - application process managed by customer with approved rebate paid by government after installation and commissioning
  - eligible for a 50% rebate up to a maximum of $2,225

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Rebate Eligibility

- Do you have a combined household income of less than $180,000 per annum? (based on tax assessment notice for 2016-17 or 2017-18 Financial Year – or proof of income such as pension received)
- Are you the owner-occupier of the home?
- Is the home valued at under $3 million?
- Don’t currently have a solar PV system installed
- Replacing or upgrading a system that was installed before November 1st 2009 (early adopter status)
- Have not already claimed the $1,000 solar hot water rebate
- Install a system between 19th August 2018 and 30th June 2019

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Overview - Key steps to follow

- Request a quote and book a site inspection to confirm final design and fixed supply and install pricing
- Accept and sign the contract for works with your solar provider
- Apply for the Solar Victoria Rebate (submit solar provider statement and confirm your rebate eligibility)
- Solar provider submits a Distributor solar connection application and gets approval
- Install the solar system and have it inspected by a third party for compliance (CES)
- Request and submit the STC assignment form, CES, Distributor Connection Approval (CR #), Electrical Works Request (EWR) and paid Invoice/Receipt to Solar Victoria
- Wait for 2 to 3 weeks for the rebate to be paid to you directly
- Meter change/reprogram by your distributor
- Sign a new FiT contract with your energy retailer
- Start enjoying the benefits of your new solar system ☺

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Resources

- Reference Guide - CEC - Guide to installing Solar PV for households:
- https://www.solaraccreditation.com.au/consumers/purchasing-your-solar-pv-system/solar-pv-guide-for-households.html

- CEC Approved Solar Retailers:
- http://www.solaraccreditation.com.au/retailers/approved-solar-retailers.html#searchResults

- CEC Approved Solar Panels:
- http://www.solaraccreditation.com.au/products/modules/building-approved-modules.html

- CEC Approved Solar Inverters:
- https://www.solaraccreditation.com.au/products/inverters/approved-inverters.html

- Victorian Solar Home Rebate Information:
- https://www.solar.vic.gov.au/en

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Questions

Register your interest for a free one on one solar design session.
Thanks for attending.

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